CLAIMS

1. The use of a water-soluble biocide as an uncoupling agent at an effective amount to control bacterial biomass in an aqueous system.

2. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 1 in which the effectiye amount of the uncoupling agent is up to 5000 mg/l.

3. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 2 in which the effective amount of the uncoupling agent is up to 3000 mg/l.

4. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 3 in which the effective amount of the uncoupling agent is up to 1000 mg/l.

5. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 4 in which the effective amount of the uncoupling agent is from 0.005mg/l to 500mg/l.

6. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 5 in which the effective amount of the uncoupling agent is from 0.01mg/l to 300mg/l.

7. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 6 in which the effective amount of the uncoupling agent is from 0.05mg/l to 100mg/l.

8. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 3 in which the effective amount is from 0.1mg/l to 10mg/l.

9. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 8 in which the effective amount of the uncoupling agent is from 0.5mg/l to 7.5mg/l.

10. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 9 in which the effective amount of the uncoupling agent is from 1mg/l to 5mg/l.

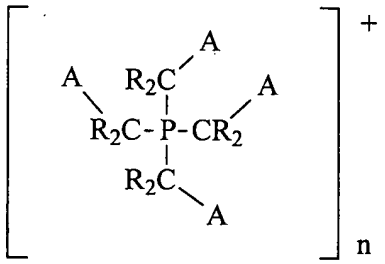
11. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 1 in which the effective amount of the uncoupling agent is from 0.1mg to 10000mg per gram of sludge solids in the aqueous system.

12. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 11 in which the effective amount of the uncoupling agent is from 0.5mg to 1000mg per gram of sludge solids in the aqueous system.

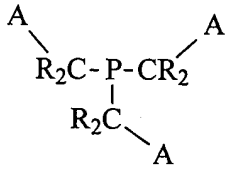
13. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 12 in which the effective amount of the uncoupling agent is from 1mg to 500mg per gram of sludge solids in the aqueous system

14. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 13 in which the effective amount of the uncoupling agent is from 5mg to 100mg per gram of sludge solids in the aqueous system

15. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims in which the water-soluble biocide comprises an alkyl substituted phosphonium compound of formula (I) or an alkyl substituted phosphine of formula an alkyl-substituted phosphine of formula (II) and a condensate of formula (III):



X^{m-}



(I) (II)

$$(AR_2CR^1{}_v\,P[R''PR^1{}_v]_k\text{-}CR_2A)^{x+}\ \frac{x}{y}\ [X]^{y-}$$

(III)

wherein:

X is an anion;

n is the valency of X represented by m;

each A can be the same or different and is selected from OH, OR, SO_3R, PO_3R_2, COOH, COOR, SO_3H, PO_3H_2, CH_2COOH, substituted alkyl, aryl and substituted amino groups;

each R, and each R in each A group, is independently selected from hydrogen, a C_1 to C_{20} alkyl, aryl, substituted alkyl or aryl, carboxy or carboxy ester; wherein each CR_2 group may be the same or different, and

R'' is a divalent hydrocarbon radical having from 2-20 carbon atoms and is optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or $PR^1{}_mCH_2OH$ groups or interrupted by one or more ether or carbonyl linkages;

each R^1 is independently a monovalent hydrocarbon radical having from 1 to 25 carbon atoms and optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or $PR^1_mCH_2OH$ groups or interrupted by one or more ether or carbonyl linkages, and

in formula (III) each v is 1 or 2, k is from 0 to 10 (e.g. from 1 to 10), x is the number of groups in the molecule having v=2 and X is a compatible anion of valency y such that the compound is water-soluble.

16. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 wherein X is selected from the group consisting of chloride, sulphate, phosphate, acetate and bromide.

17. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 or claim 16, wherein the alkyl-substituted phosphonium compound is tetrakis (hydroxymethyl) phosphonium sulphate.

18. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 or claim 16 wherein the alkyl-substituted phosphonium compound is selected from a group consisting of tetrakis (hydroxymethyl) phosphonium chloride, tetrakis (hydroxymethyl) phosphonium bromide, tetrakis (hydroxymethyl) phosphonium acetate and tetrakis (hydroxymethyl) phosphonium phosphate.

19. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 15 in which the condensate is a condensate of tris(hydroxyorgano)phosphine with a nitrogen containing compound.

20. The use of a water-soluble biocide as an uncoupling agent as claimed in claim 19 in which the nitrogen containing compound is selected

from the group consisting of a C_{1-20} alkylamine, dicyandiamide, thiourea and guanidine.

21. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of claims 1 to 14 wherein the uncoupling agent comprises a compound selected from the group consisting of quaternary ammonium compounds; polymeric quaternary ammonium compounds; polymeric biguanide hydrochlorides; tris(hydroxymethyl)nitromethane; 4,4-dimethylozazolidine; phenoxypropanol; phenoxyethanol; glyoxal; acrolein; aldehydes; triazines; quaternary phosphonium compounds; 2-bromo-4-hydroxyacetophenone; carbamates; tertbuthylazine; tetrachloro-2,4,6-cyano-3-benzonitrile; thiazole and isothiazole derivatives; compounds with activated halogen groups; bis chloromethyl sulphone, and methylene bis thiocyanate.

22. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims in which the water-soluble biocide is formulated with one or more of a surfactant; an antifoam; a scale inhibitor; a corrosion inhibitor; a biocide, a flocculant, a dewatering aid and a dispersant.

23. The use of a water-soluble biocide as an uncoupling agent as claimed in any one of the preceding claims wherein the aqueous system is a wastewater treatment plant used for the treatment of industrial or municipal effluent.

24. An uncoupling agent comprising one or more conventional, water-soluble, water treatment biocide(s) as claimed in any one of claims 15 to 21.

25. A method for controlling the growth of bacterial biomass in an aqueous system comprising adding to, or contacting with, the aqueous

system an effective amount of an uncoupling agent which is a water-soluble biocide as defined in any one of claims 15 to 21.

26. A method as claimed in claim 25 in which the method comprises contacting an effective amount of a water-soluble biocide directly with the bacterial biomass.

27. A method as claimed in claim 25 or claim 26 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 5000 mg/l.

28. A method as claimed in claim 27 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 3000 mg/l.

29. A method as claimed in claim 28 in which the effective amount of the water-soluble biocide added to the aqueous system is up to 1000 mg/l.

30. A method as claimed in claim 29 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.005 mg/l to 500 mg/l.

31. A method as claimed in claim 30 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.01 mg/l to 300 mg/l.

32. A method as claimed in claim 31 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.05 mg/l to 100 mg/l.

33. A method as claimed in claim 32 in which the effective amount of the water-soluble biocide is from 0.1 mg/l to 10mg/l.

34. A method as claimed in claim 33 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.5 mg/l to 7.5mg/l.

35. A method as claimed in claim 34 in which the effective amount of the water-soluble biocide added to the aqueous system is from 1mg/l to 5mg/l.

36. A method as claimed in claim 25 or claim 26 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.1 mg to 10000mg per gram of sludge solids in the aqueous system.

37. A method as claimed in claim 36 in which the effective amount of the water-soluble biocide added to the aqueous system is from 0.5 mg to 1000mg per gram of sludge solids in the aqueous system.

38. A method as claimed in claim 37 in which the effective amount of the water-soluble biocide added to the aqueous system is from 1 mg to 500mg per gram of sludge solids in the aqueous system.

39. A method as claimed in claim 38 in which the effective amount of the water-soluble biocide added to the aqueous system is from 5mg to 100mg per gram of sludge solids in the aqueous system.

40. The use of a water-soluble biocide as an uncoupling agent substantially as described herein with reference to the accompanying examples.

41. An uncoupling agent comprising a conventional, water-soluble, water treatment biocide substantially as described herein with reference to the accompanying examples

42. A method of controlling the growth of a bacterial biomass in aqueous systems substantially as described herein with reference to the accompanying examples.